



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of Vahan Avetisian

Serial No.: 09/733,813

Filed: 12/08/2000

Title: "Overmolded Body for Pyrotechnic Initiator and Method of Molding Same"

**Technology Center 3600**

(Group Art Unit 3641 / Examiner James Bergen)

**APPEAL BRIEF**

Mail Stop **APPEAL BRIEF - PATENTS**

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/ Thomas J. Brindisi /

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(i) Real Party in Interest

The real party in interest in this application is Special Devices Incorporated, which is incorporated under the laws of Delaware and has its principal place of business at 14370 White Sage Road, Moorpark, California 93021.

(ii) Related Appeals and Interferences

No related appeals or interferences are known to appellant, counsel, or assignee.

(iii) Status of Claims

At the time of filing the notice of appeal in this case, claims 1 through 29 had been presented, of which claims 6, 14, 17, 18, and 21-25 had been canceled. Presently pending claims 1-5, 7-13, 15, 16, 19, 20, and 26-29 all stand rejected, and all are subject to this appeal.

(iv) Status of Amendments

No amendments were filed after the final rejection.

(v) Summary of the Claimed Subject Matter

Appellant's invention comprises a novel and non-obvious automotive pyrotechnic initiator and method of making the same. Prior to this invention, automotive initiators had only utilized electrically non-conductive outer protection that did not surround substantially all of the initiator and/or was in multiple parts. Though drawbacks were associated with such designs, there were inherent obstacles to implementing an integral, unitary

"overmolded" body in an automotive initiator (in which the body should provide structural support and installation features). These obstacles were overcome by the present invention, which is broadly defined in claim 1 as follows (with references to the specification italicized in brackets):

1. An automotive pyrotechnic initiator [*ref. 10 in Fig. 1 and p.2/ln.3*], comprising:
  - a) an initiator subassembly [*all elements of Fig. 1 except ref. 55*] including a can [*ref. 65 in Fig. 1 and p.2/ln.8, p.3/ln.21 to p.4/ln.5*] loaded with a pyrotechnic charge [*ref. 82 in Fig. 1 and p.2/ln.9, p.4/ln.9*], and a header assembly [*ref. 20 in Fig. 1 and p.2/lns.7-9*] having an igniter wire [*ref. 70 in Fig. 1 and p.2/lns.10-12*] and a connector end [*including refs. 30 & 40 in Fig. 1 and p.2/ln.14*]; and,
  - b) a molded, integral, unitary electrically-nonconductive overmolded body [*ref. 55 in Fig. 1 and p.2/ln.20 to p.5/ln.4*] connected to and surrounding substantially all of said initiator subassembly except for an exposed portion [*lower portion of refs. 30 and 40 in Fig. 1 and p.4/lns.13, 20*] of said connector end, wherein said body provides structural support and installation orientation features [*including refs. 57 & 58 in Fig. 1 and p.3./ln.9, p.4/ln.17 to p.5/ln.4*].

Independent claim 8 is drawn to the corresponding method of making and is otherwise identical to claim 1 except that the word "providing" precedes element a), and the term "molding an" is substituted for "a molded" at the beginning of element b).

Dependent claims reciting additional optional features argued to provide further bases of patentability herein<sup>1</sup> are:

- Claim 12 – molten material is injected into a mold containing the initiator subassembly [p.2/ln.23 to p.3/ln.13].
- Claims 15 (dependent from claim 12) and 29 – the molten material is injected at the upper region [ref. 56 in Fig. 1 and p.3/lns.7, 15, 23] of, and flows downwardly along [p.3/lns.8, 14-23], the initiator subassembly.
- Claims 13 and 16 (respectively dependent from claims 12 & 15) – the molten material is injected at high pressure [p.4/ln.4].
- Claim 20 (dependent from claim 13) – the can of the initiator subassembly is tightly and substantially completely loaded with pyrotechnic charge [p.4/lns.8-10].

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<sup>1</sup> For the sake of brevity, other additional features recited in the claims are not argued in this appeal brief. Applicant does not thereby concede that none might provide additional bases for distinguishing the cited or other prior art.

(vi) Grounds of Rejection To Be Reviewed

The rejections involved in this appeal are under 35 U.S.C. § 103. The first ground presented for review is the final rejection of claims 1-5, 7-11, 19, and 26-28 as obvious in light of the combination of U.S. Patent No. 5,576,509 to Refouvelet et al. ("Refouvelet"; Evidence Appendix, **tab 1**), and alternately either U.S. Patent No. 3,906,858 to Craig et al. ("Craig"; Evidence Appendix, **tab 2**), or U.S. Patent No. 2,741,179 to Taylor et al. ("Taylor"; Evidence Appendix, **tab 3**).<sup>2</sup> Refouvelet discloses one embodiment of an automotive initiator having non-conductive outer protection that does not surround substantially all of the initiator (ref. 10 in Fig. 2 and col.2/lns.60-61), and a second embodiment in which the protection does surround substantially all of the initiator but is in two parts (refs. 10 and 16 in Fig. 2 and col.4/ln.25-26). Craig teaches an igniter having a non-unitary (two-part) electrically non-conductive covering (coating 65 and disk 46 in Figs. 1-4). Taylor teaches a blasting detonator having a rubbery sheath or coating (ref. 13 in the Fig. and col.1/lns.60-64, col.2/lns.55-58) that cannot provide structural support or installation orientation features.

The Examiner asserts that it would have been obvious to one of ordinary skill in the automotive initiator art "to extend the

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<sup>2</sup> The rejections of claims 7, 19, and 28 involve an additional reference, but are not argued separately here.

pre-existing integral and unitary overmolded [sic]<sup>3</sup> plastic body 10 of Refouvelet et al. such that it surrounded substantially all of the initiator subassembly of the Refouvelet et al. initiator to form a protective casing therefore, in view of the teachings of Taylor et al. or Craig et al. noted above." (Final Office Action, page 5). It is submitted that a prima facie case of obviousness was not made as to these claims, but even if it was, it was rebutted by evidence that was submitted in response.

Further grounds of rejection presented for review here are the final rejections of claims 12, 13, 15, 16, 20, and 29 as obvious under Section 103 in light of the same alternate combination of Refouvelet and either Craig or Taylor (hereafter "the primary combination"), further combined with one or both of two additional references as follows:

- Claims 12, 13, and 20 over the primary combination, combined further with U.S. Patent No. 5,576,509 to Swann et al.
- Claims 15, 16, and 29 over the primary combination, combined further with Swann et al., and combined still further with U.S. Patent No. 2,968,985 to Seavey.

It is respectfully submitted that each of these obviousness rejections is also unfounded for further reasons.

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<sup>3</sup> The "plastic body 10" of Refouvelet is not "overmolded" as defined in the subject prosecution to refer to a molding that extends substantially around all of the initiator except for the connector end. In most cases the Examiner has used the term "overmolded" improperly to refer simply to a molded part.

(vii) Argument

At the outset, it is respectfully submitted that the appealed rejection should not have been made final. The first action (mailed July 8, 2004) after the RCE filed on April 9, 2004 was not a complete action because it completely omitted acknowledgement of or comment on the accompanying Declaration of Vahan Avetisian under 37 CFR 1.132 (Evidence Appendix, **tab 4**), which addressed the prior art rejections and asserted various misinterpretations thereof in the preceding Office Action.<sup>4</sup> The second Office Action admitted at page 2, paragraph 2 that the declaration was not addressed, but alleged that it had been *considered* before the prior action and was "not found to be convincing" because "the author of the Declaration is one of the named inventors of the instant application." Without further discussion of the declaration, the Examiner stated that the first action was complete, and made the second rejection final. It is respectfully submitted that neither action in this case was complete under MPEP 716.02(B), final rejection was improper, and this application should be remanded for a first action.

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<sup>4</sup> MPEP 716.01(B). "Evidence traversing rejections must be considered by the examiner whenever present. All entered affidavits, declarations, and other evidence traversing rejections are acknowledged and commented upon by the examiner in the next succeeding action. ... Where the evidence is insufficient to overcome the rejection, the examiner must specifically explain why the evidence is insufficient. General statements such as 'the declaration lacks technical validity' or 'the evidence is not commensurate with the scope of the claims' without an explanation supporting such findings are insufficient."



A. Claims 1-5, 7-11, 19, and 26-28

As noted, the rejection of these claims is based on Refouvelet, modified by the teachings of another reference. The Examiner first admits that "Refouvelet et al. do not disclose ... the electrically-nonconductive overmolded body surrounding substantially all of the initiator subassembly," as per claim 1. (Office Action, §5, 3<sup>rd</sup> ¶). The Examiner then argues that:

Lines 4-6 of the abstract state that the casing includes a molded plastics material surrounding at least the endplate and a portion of the electrodes. **This statement** can be reasonably interpreted to mean that the molded plastics material can surround somewhat more ... and **does not preclude the molded plastic potentially surrounding the upper portion of the initiator.**

(Id., 4<sup>th</sup> ¶ (underline original; bold added)).

The Examiner's analysis ignores what Refouvelet discloses, and equally overlooks what it is missing. There is no need to look to another reference for "the molded plastic ... surrounding the upper portion of the initiator," as Refouvelet already expressly discloses that. In Fig. 2, substantially all of the subassembly including its upper portion is surrounded by a (two-part) casing 3 comprising the molded plastic material 10 and a plug 16 of the same plastic material attached (by welding, glue, etc.) over the top of the initiator. (Col.4/lns.25-26, 56-60).<sup>5</sup>

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<sup>5</sup> That the Examiner has missed this point is clear from his combining Refouvelet with *Craig*, which as explained below essentially discloses the same thing as Fig. 2 of Refouvelet.

Conversely, the Examiner ignores what Refouvelet actually **is** missing: a unitary and integral protective outer portion that surrounds substantially all of the assembly. In *that* regard, Refouvelet cannot be construed reasonably to imply that its teachings are amenable to such a modification. To the contrary, as explained in paragraph 4 of the Avetisian Declaration, such a modification is clearly taught away from. For example, Refouvelet shows that in order for the non-conductive casing (such as the partial casing of its first embodiment) to extend over the top of the initiator (as in its second embodiment), the casing is broken into two parts (molded plastic material 10 and molded plastic plug 16 in Fig. 2).

Even assuming *arguendo* that Refouvelet were amenable to modification by another reference so as to result in the claimed invention (which it is not), as explained below, neither Craig nor Taylor could properly provide Refouvelet its missing element.

#### 1. Craig

Reliance on Craig is clearly misplaced, because it simply discloses a non-unitary (two-piece) coating 65 and disk 46 like the non-unitary (two-piece) embodiment of Fig. 2 of Refouvelet.<sup>6</sup>

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<sup>6</sup> The ordinary meaning of "unitary" requires that something be "undivided, whole." (Merriam Webster's Collegiate Dictionary, 10<sup>th</sup> Ed. 1995). In contrast, there are clearly divisions between Craig's disc 46 and coating 65, which are depicted as two arcuate line segments in Fig. 1, and as two short vertical straight line segments in Fig. 2.

Thus, Craig does not meaningfully alter or add to the missing teaching of Refouvelet. Moreover, there would have been no motivation to "modify" Refouvelet with redundant teachings from Craig or any other reference disclosing a two-piece surrounding.

## 2. Taylor

Taylor does disclose a substantially totally surrounding electrically non-conductive protective outer portion, but it cannot plausibly be combined with Refouvelet in this regard, and in any case there was no motivation to do so. As noted in the Avetisian Declaration, Taylor's "rubberlike coating" is inapplicable to the context of an automotive initiator,<sup>7</sup> and in any case Taylor's teachings could not possibly be applied to those of Refouvelet in such a way as to result in the claimed "integral, unitary ... overmolded body connected to and surrounding substantially all of said initiator subassembly ... wherein said body provides structural support and installation orientation features." As Mr. Avetisian, who has nearly a decade of experience in the automotive initiator field, stated under penalty of perjury in paragraphs 6-7 of his declaration:

There would have been no motivation for one of ordinary skill in  
the art at the time of the invention to attempt to apply the rubberlike  
"sheath" or "coating" of the Taylor detonator to an automotive initiator

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<sup>7</sup> Both the Examiner and Appellant have agreed that the term "automotive" presents an affirmative limitation in independent claims 1 and 8, though contained in their preambles.

made according to Refouvelet. The construction and manufacturing techniques relevant to the Taylor detonator are so dissimilar to those of automotive initiators (e.g., the detonator has a matchhead rather than an initiator charge that is directly hermetically enclosed by a can, the detonator simply has wire leads at its end rather than a highly defined connector end, the detonator's rubberlike coating does not provide any support or engagement feature, etc.) that one of ordinary skill in the art would have been directly discouraged from any such attempt as it would have been useless.

The rubberlike sheath or coating of Taylor also cannot properly be combined with an automotive initiator according to the teachings of Refouvelet as it would not result in a useful device due to the dissimilarity of the construction and manufacturing techniques as noted in the previous paragraph. Taylor does not contribute in any way to solving the problem overcome by Applicant (see e.g., page 2, line 24 to page 4, line 10) of how to provide an automotive initiator with a unitary, integral molded body that surrounds substantially all of the initiator subassembly and provides structural support and installation orientation features.

It is respectfully submitted that a prima facie case of obviousness was never made, but even if it was, it was overcome by the evidence and arguments submitted by Appellant.

B. Claims 12, 13, and 20

The arguments of the preceding section A are incorporated here by reference. Claims 12, 13, and 20 each additionally recite that the body of the claimed initiator is insert-molded, which is generally a high-pressure process. (See p.4, line 4; also, claims 13 and 20 expressly specify high pressure). In the context of the claimed invention – in which an integral, unitary, electrically-nonconductive, overmolded body is molded around substantially all of an automotive initiator subassembly, providing structural support and installation orientation features – insert molding would not have been obvious because of the difficulties apparent from the discussion in the specification at page 3, line 14 to page 4, line 10 (which also describes how the present invention overcomes them). Thus, there would have been further disincentive to modify Refouvelet to incorporate a unitary overmolding (e.g., from Taylor) if insert-molding were contemplated as recited in claims 12, 13, and 20.

Claim 20 further recites that the initiator's can is tightly and substantially completely loaded with pyrotechnic charge. This ameliorates high-pressure insert-molding injection issues (as noted at page 4, lines 7-10 of the specification), and it is submitted that it was not an obvious way of doing so and no specific explanation has been provided to the contrary.

C. Claims 15, 16, and 29

The arguments of the preceding sections A and B are incorporated here by reference. Claims 15, 16, and 29 each additionally recite that the molten material is injected at the upper region of, and flows downwardly along, the initiator subassembly. These claims are also not obvious for the further reason that the difficulties apparent from the discussion in the specification at page 3, line 14 to page 4, line 10 would have discouraged injecting the upper region of an insert-molded automotive initiator.

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Following this page is a Claims Appendix setting forth the pending claims of this application, followed by an Evidence Appendix containing the prior art references discussed herein and the Avetisian Declaration. Appellant respectfully requests that the present Appeal be acted upon favorably.

Respectfully submitted,  
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Dated: May 19, 2005

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(viii) Claims Appendix

Pending rejected claims 1-5, 7-13, 15, 16, 19, 20, and 26-29 of this application read as follows:

1. An automotive pyrotechnic initiator, comprising:
  - c) an initiator subassembly including a can loaded with a pyrotechnic charge, and a header assembly having an igniter wire and a connector end; and,
  - d) a molded, integral, unitary electrically-nonconductive overmolded body connected to and surrounding substantially all of said initiator subassembly except for an exposed portion of said connector end, wherein said body provides structural support and installation orientation features.
2. The initiator of claim 1, wherein said connector end of said header assembly comprises two electrode pins.
3. The initiator of claim 2, wherein said electrode pins project outwardly from said body.
4. The initiator of claim 3, wherein one of said electrode pins is a ground pin and the other is an isolated electrode pin.
5. The initiator of claim 4, wherein said body and said electrode pins together form a serviceable or non-serviceable integral automotive airbag initiator connector.
7. The initiator of claim 1, wherein said body is made of nylon.

8. A method for making an automotive pyrotechnic initiator having an overmolded body, comprising the steps of:

- a) providing an initiator subassembly including a can loaded with a pyrotechnic charge, and a header assembly having an igniter wire and a connector end; and,
- b) molding an integral, unitary, electrically-nonconductive, overmolded body around said subassembly, such that said body is connected to and surrounds substantially all of said initiator subassembly except for an exposed portion of said connector end, wherein said body provides structural support and installation orientation features.

9. The method of claim 8, wherein said step of providing includes providing an initiator subassembly wherein said connector end of said header assembly comprises two electrode pins.

10. The method of claim 9, wherein said step of providing includes providing an initiator subassembly that includes a ground pin and an isolated electrode pin.

11. The method of claim 9, wherein said step of molding includes molding said body such that an exposed portion of each of said electrode pins projects outwardly from said body.

12. The method of claim 9, wherein said step of molding includes injecting molten material into a mold in which said initiator subassembly is placed.

13. The method of claim 12, wherein said step of molding includes injecting molten material into said mold under pressure.



15. The method of claim 12, wherein said step of providing includes providing an initiator subassembly having an upper region, and wherein said step of molding includes injecting said molten material at said upper region of said initiator subassembly, and allowing said molten material to flow downwardly along said subassembly.

16. The method of claim 15, wherein said step of molding includes injecting molten material into said mold under pressure.

19. The method of claim 8, wherein said step of molding includes injecting molten nylon.

20. The method of claim 13, wherein said step of providing includes providing an initiator subassembly wherein said can is tightly and substantially completely loaded with said pyrotechnic charge.

26. The initiator of claim 1, wherein said header assembly is a glass-to-metal sealed header assembly.

27. The initiator of claim 5, wherein said header assembly is a glass-to-metal sealed header assembly.

28. The initiator of claim 27, wherein said body is made of nylon.

29. The method of claim 15, wherein said header assembly is a glass-to-metal sealed header assembly.

(ix) Evidence Appendix

**Tab 1** - U.S. Patent No. 5,576,509 to Refouvelet et al. (entered by Examiner Harold Tudor with Office Action mailed 9/3/2002).

**Tab 2** - U.S. Patent No. 3,906,858 to Craig et al. (entered by Examiner Harold Tudor with Office Action mailed 9/3/2002).

**Tab 3** - U.S. Patent No. 2,741,179 to Taylor et al. (entered by Examiner Harold Tudor with Office Action mailed 9/3/2002).

**Tab 4** - Declaration of Vahan Avetisian under 37 CFR 1.132 dated April 9, 2004 (filed with RCE of even date, and entered (per the Office Action mailed 12/14/2004, at \$3) by Examiner James Bergin with the Office Action mailed 7/8/2004).

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

<b>1<sup>st</sup> Named Inventor:</b> Vahan Avetisian	<b>Group Art Unit:</b> 3641
<b>Serial No.:</b> 09/733,813	
<b>Filed:</b> 12/8/2000	<b>Examiner:</b> Harold J. Tudor
<b>Title:</b> Overmolded Body for Pyrotechnic Initiator and Method of Molding Same	

**DECLARATION UNDER 37 C.F.R. § 1.132**

I, Vahan Avetisian, do declare and state as follows:

1. All statements herein are made based on my own personal knowledge except where it is indicated that a statement is based on information and belief. All statements made of my own knowledge are true, and all statements made on information and belief are believed to be true.

2. I am an inventor listed on the above-identified patent application ("this patent application"). I am skilled in the art of pyrotechnic initiators, and in particular, automotive airbag initiators and the bodies used in such initiators. I obtained a bachelors of science degree in Mechanical Engineering from University of California, Los Angeles in 1991. I have worked in the field of automotive initiators for approximately eight years.

3. I am familiar with U.S. Pat. No. 5,576,509 to Refouvelet et al. ("Refouvelet"), U.S. Pat. No. 2,741,179 to Taylor et al. ("Taylor"), and U.S. Pat. No. 3,906,858 to Craig et al. ("Craig").

4. In Fig. 1 of Refouvelet, the molding stops conventionally near the middle of the initiator; in Fig. 2, a separate pre-formed plug (16) is attached - not molded - onto the top end above the molded body. The statement in the Abstract of Refouvelet that "at least" the *endplate* could be covered by the plastic molding (10) does not reasonably imply that, alternatively, an extended unitary molding could be further extended so as to surround the upper portion of the initiator (instead of plug 16). Such an implication clearly would not have been drawn because the open-ended/non-hermetic upper end of the Refouvelet initiator teaches away from the possibility of molding a body in that region (i.e., providing an "overmolded" body) - the adjacent charge would present an undue hazard of auto-ignition under the heat and pressure of the process. The fact that Refouvelet's Fig. 2 embodiment shows a two-piece non-unitary, non-integral body further precludes such an implication. The numerous prior art in the field also independently teach away from such an implication, because every known prior art design with a casing surrounding the entire initiator has utilized a multi-part casing in which a distinct, separate piece (e.g., a cap or a cup) covers the top of the initiator.

5. Like Refouvelet, Craig shows an electrically non-conductive casing that surrounds substantially all of the initiator subassembly, but which is in two distinct parts rather than being integral and unitary. In Refouvelet, the casing (3) comprises a plastic plug (16) covering the top of the initiator and bonded to a plastic molding (10) by welding, adhesives, or clips. (See Fig. 2; col. 4, lines 49-60). Likewise, in Craig, "disc, pad or cover 46 is disposed over igniter 10 sealing cavity 26 ... extending over the ends or nonrecessed portions 48a, 48b of electrically conductive members 16a, 16b ... [and] is made of a suitable dielectric material, such as synthetic rubber,

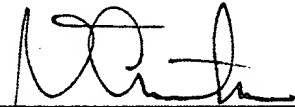
which may be joined to the igniter members by a suitable adhesive.” (Col. 4, lines 37-47). Neither reference remotely suggests an integral, unitary body, nor would any combination of these references do so.

6. There would have been no motivation for one of ordinary skill in the art at the time of the invention to attempt to apply the rubberlike “sheath” or “coating” of the Taylor detonator to an automotive initiator made according to Refouvelet. The construction and manufacturing techniques relevant to the Taylor detonator are so dissimilar to those of automotive initiators (e.g., the detonator has a matchhead rather than an initiator charge that is directly hermetically enclosed by a can, the detonator simply has wire leads at its end rather than a highly defined connector end, the detonator’s rubberlike coating does not provide any support or engagement feature, etc.) that one of ordinary skill in the art would have been directly discouraged from any such attempt as it would have been useless.

7. The rubberlike sheath or coating of Taylor also cannot properly be combined with an automotive initiator according to the teachings of Refouvelet as it would not result in a useful device due to the dissimilarity of the construction and manufacturing techniques as noted in the previous paragraph. Taylor does not contribute in any way to solving the problem overcome by Applicant (see e.g., page 2, line 24 to page 4, line 10) of how to provide an automotive initiator with a unitary, integral molded body that surrounds substantially all of the initiator subassembly and provides structural support and installation orientation features.

8. In summary, none of the cited references, alone or in any reasonable combination, taught or suggested to one of ordinary skill in the art an integral and unitary overmolded body surrounding substantially all of an initiator subassembly (including its upper section).

9. I understand that willful false statements and the like are punishable by fine or imprisonment, or both (18 U.S.C. § 1001), and may jeopardize the validity of this patent application or any patent issuing thereon.

  
Vahan Avetisian

Date: April 9, 2004